

FISHLIFE

Part 9 in a series about inshore fish of Hawaii. The 12-part series is a project of the **Hawaii Fisheries Local Action Strategy**.



Photo: NOAA

NAME **GOATFISH**

IS IT HOT IN HERE? GOATFISH SPAWN AS WATER WARMS

BY SCOTT RADWAY

AS THE OCEAN STARTS TO WARM UP EACH SPRING, SO DO SOME OF HAWAII'S FAVORITE GOATFISH.

Each year, as we exit the winter months and the water temperature pushes back up to 76 degrees, the weke 'a (yellowstripe goatfish) and weke 'ula (yellowfin goatfish) start preparing for spawning. What does that mean? The fish start generating the eggs that they will release over the next several months when spawning success is likely optimal.

That's some of the preliminary findings of Heather Leba, of the University of Hawaii. "What I am finding is that spawning usually follows ocean temperature regimes," says Leba. "So as the temperature hits 76 degrees the fish start to get fatter."

Leba found that the ovaries of the female goatfish started growing at those times and

became proportionally more of the fish's body weight. With that measure, her research shows spawning peaks in March and April into May and then tapers off into July and August when the water reaches its warmest level.

"That's the point you start to see the reproduction drop off," she says.

Leba is also researching kumu (whitesaddle goatfish) but she has not been able to find enough of that fish to make any clear determinations. Of the two weke, she was able to sample 10 to 20 a month over a year. But she adds with limited sampling, it does appear that kumu is also spawning during the peak times that the weke are spawning.

That's no minor discovery.

Leba's preliminary findings are a giant step forward for Hawaii in managing goatfish, which are a popular recreational fish and also support

There are 11 species of goatfish in Hawaii, two are found only in the state. Here are the goatfish basics.

- ◆ Goatfish are tireless sea floor feeders, using a pair of long chemosensory barbels protruding from their chins to rifle through the sand in search of a worms, crustaceans and mollusks.
- ◆ By day, many goatfish will form large non-feeding schools. By night the schools disperse and individual goatfish head their separate ways to loot the sands.
- ◆ All goatfish have the ability to change their coloration depending on their current activity. For example, the yellowfin goatfish sometimes swims with blue-striped snappers and changes its coloration to match the snappers.
- ◆ Goatfish are pelagic spawners; that is, they release buoyant eggs into the water, which drift out to sea where they hatch.

Source: Jack Randall

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If snappers and jacks depend on goatfish for food, what happens to those fish if there are no goatfish to eat?

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a local commercial market. Because while goatfish are very tasty fish, eaten the world over, they are not a very well studied fish when it comes to reproduction. In all, there are some 62 species worldwide, in tropical and semi-tropical waters from the Caribbean to the Mediterranean to nearly every warm corner of the Pacific. "But only about one-sixth have been studied in depth as far as reproduction," says Leba.

Leba says that one reason to focus on goatfish is the popularity of the resource culturally in Hawaii. But she adds the fish play an important role ecologically. In places around the world and in local watersheds such as Maunalua Bay on Oahu, goatfish have been identified as indicator species, which means by monitoring their health over time you can estimate the health the entire reef community.

One reason for that, explains Gerry Davis, of the National Oceanic and Atmospheric Administration, is the role goatfish play in the food chain. Goatfish feed on crabs, mussels and worms. In fact, the whisker-like

extensions below its mouth (called barbels) are used to effectively probe sandy areas for prey. That makes goatfish a critical part of the food chain as they bring energy from small animals up to the big fish that feed on goatfish, such as snapper and jacks.

"The health of a lot of your other fisheries are dependent on goatfish," Davis says.

One reason for concern about Hawaii's goatfish is the decline in commercial catch over the past several years. For weke 'a, total pounds landed dropped from 32,000 in 1997 to 8,300 in 2005. For weke 'ula, the haul was 26,000 pounds in 1997, then peaked in 2006 at nearly 50,000, but then plummeted to 21,000 pounds in 2005. Kumu went from 5,100 pounds in 1997 to 2,500 pounds in 2005.

Leba says she also hears anecdotally from fishermen that the numbers of goatfish are dropping, including reports from fishermen in places like Kailua that report there are no longer good runs of juvenile goatfish called 'oama.

One reason for the declines, Leba says, could be a lack of large adult goatfish to replenish the stocks. Areas such as Guam have demonstrated that some goatfish produce exponentially more eggs as they get older and are critically important to a healthy fishery. It is likely that is also the case in Hawaii.

"There is a possibility that the populations left are not self-sustainable, but I don't think it is at that state yet," she says.

However, her research into spawning times can be used to help boost potentially declining goatfish stocks. Up until now, Hawaii has managed its goatfish mainly by size limits. But seasonal closings would protect goatfish during the spawning season where the important breeding population is vulnerable to over-harvesting as it gathers together to spawn.

"A lot of these species are culturally important and this crucial life history information can facilitate better management decisions," Leba says.

Heather Leba dissected goatfish every month over the course of a year to determine when the fish spawned. For weke 'a and weke 'ula she found peak spawning is March, April and May. For kumu, Leba still needs to find more fish samples.



Photo: Heather Leba

POWERFUL NAMES



In traditional Native Hawaiian culture, weke were a popular food fish. According to Margaret Titcomb's book, "Native use of Fish in Hawaii," the oama (young) were delicious when eaten raw after being salted for a few minutes or dried. "To remove the scales, the oama was put in large containers with pebbles and sand," Titcomb writes. Then they were stirred and rinsed with seawater. Adult weke were eaten raw or cooked, usually in ti leaves.

Titcomb writes that both the red and light-colored weke were popular prayer offerings, with the color depending on the occasion. "The meaning of the term weke (to open) also gave value to the fish in sorcery," she writes. A priest might offer a fish in a prayer to release or open something, such as evil thoughts or to obtain forgiveness.

Kumu were also used in offerings, such as when a canoe launched or in hula ceremonies. It was offered, too, to people who had completed an apprenticeship and were now masters, one of the meanings of the fish's name.



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